Patient Preference and Adherence

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ORIGINAL RESEARCH

Bridging Knowledge Gaps in Prostate Cancer Screening Among Northern Saudi Males: Implications for Improving Screening Adherence and Early Detection

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Background and Objectives: Prostate cancer (PCa) is the second most commonly diagnosed cancer among men worldwide Insufficient awareness and poor attitudes towards PCa adversely impact early detection efforts among men. The present study aimed to assess the knowledge, attitude, and associated factors towards PCa and its screening among northern Saudi males.

Methods: Using a validated data collection tool, we surveyed 381 males in this cross-sectional study in the Arar and Aljouf regions of Saudi Arabia. We applied Spearman's test to find the correlation between knowledge and attitude domains. Using the binary logistic regression model, we determined the predictors associated with the knowledge and attitude.

Results: We found that less than half of the males had high levels of knowledge (37.0%) and attitude (47.5%) towards PCa. Knowledge was significantly higher among those working in the private sector (adjusted odds ratio [aOR] = 2.79, 95% confidence interval [CI] = 1.63–4.22, p = 0.003) and among those with a family history of PCa (aOR = 2.11, 95% CI = 1.75–2.81, p = 0.017). Significantly lower levels of knowledge are observed in people aged above 55 years (aOR = 0.78, 95% CI = 0.53–0.91, p = 0.009) and those residing in rural areas (aOR = 0.53, 95% CI = 0.27–0.81, p = 0.007). Regarding attitude, we found that smokers (aOR = 0.48, 95% CI = 0.27–0.62, p = 0.001) and those living in rural areas (aOR = 0.59, 95% CI = 0.44–0.81, p = 0.004) had significantly lower levels.

Conclusion: Suboptimal knowledge and attitudes toward PCa screening highlight the need for targeted public health campaigns, workplace education, and rural outreach programs to improve early detection and reduce the burden of PCa.

Keywords: prostate cancer, screening adherence, knowledge, attitude, Saudi Arabia

Introduction

Prostate cancer (PCa) is the second most commonly diagnosed cancer among men worldwide, accounting for approximately 14.2% of new cancer cases in men, according to the Global Cancer Observatory database of the International Agency for Research on Cancer data.[1] The incidence of PCa varies widely by geography, with the highest rates reported in high-income countries such as those in North America and Europe, and the lowest rates observed in many African and Southeast Asian countries.[2–4] This variation across the countries could be attributed to differences in the readiness and utilization of healthcare facilities and the existence of knowledge and healthcare coverage policies, such as screening.[4] Although the exact etiology of PCa is multifactorial, several risk factors have been established, including increasing age, family history, and specific genetic factors (mutations in BRCA1 and BRCA2), as well as lifestyle factors such as smoking and obesity.[3,5,6]

Similar to several developed countries, the prevalence of PCa is alarming and ranked the second most common cancer among men in the Kingdom of Saudi Arabia (KSA).[7,8] The increasing incidence parallels global trends, highlighting the

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need for effective early detection strategies. In the KSA, recently Alasker A et al analyzed the PCa patients' data retrospectively and found that more than 30% of the PCa patients presented with metastasis.[9] The evidence documented by Alasker A et al indicates an alarming rate of late diagnosis of PCa in this region. Hence, it is critical to diagnose PCa at an early stage through a screening program, so that the patient's treatment outcomes and quality of life can be significantly improved. Furthermore, this would decrease the healthcare cost associated with the late diagnosis.[10,11]

In the KSA, all healthcare services at the Ministry of Health (MOH) facilities are provided free of charge.[12,13] Although there is no mandatory screening program in the KSA, the MOH encourages screening for PCa for those who are at higher risk of developing PCa.[9]

Insufficient awareness and poor attitudes towards PCa adversely impact early detection efforts among men. Previous studies from the Middle East and other regions indicate that a sizable proportion of men had less desirable knowledge of the PCa risk, symptoms, and the importance of early diagnosis.[14–16] For example, a study by Maladze A et al in 2023 demonstrated that about two-thirds of their participants who were older than 40 years had inadequate awareness of PCa. Even though their study showed that a majority of the participants had an overall positive attitude, some critical domains of attitude, such as the benefits of treatment, had poor attitudes.[17] In 2022, Jarb AF et al evaluated the awareness of Saudi men in Western cities and found that only about 11% of them had good knowledge.[16] Another Saudi study that was carried out among the general male population reported that about 55% had good knowledge and attitude.[18] Furthermore, there are cultural barriers and misconceptions about PCa screening, which will also limit early health-seeking behaviors among Saudi males. Numerous patients are afraid of receiving a diagnosis, making certain conclusions about the results of the test, and not trusting healthcare organizations.[15]

These existing knowledge gaps and a lack of sufficient awareness regarding PCa are very much critical in PCa screening program uptake among high-risk populations. Advances in prostate cancer diagnostics, including multiparametric MRI and refined clinical predictors, have improved early detection. However, these benefits can only be realized if men are aware of the need for screening and actively seek evaluation.[19] Additionally, ongoing assessment of men's awareness and attitude toward PCa is essential for policymakers to plan for the appropriate strategies that include targeted interventions. This is essential to improve awareness and reshape attitudes towards PCa screening. However, we did not find adequate studies in this region, especially in northern Saudi Arabia. Therefore, the present study aimed to assess the knowledge and attitudes of northern Saudi males towards PCa and its screening. Additionally, we determined the predictors that are associated with the participants' knowledge and attitude.

Materials and Methods

Study Design and Setting

We used a cross-sectional study design. The present study was conducted from January 2025 to May 2025 at various public places in two regions of northern Saudi Arabia (Arar and Aljouf). The public places included were public parks, mosques, and malls.

Inclusion and Exclusion Criteria

The present study included all male Saudi participants aged 40 to 65 years who belonged to these two regions. We excluded those who were unwilling, mentally unstable, and already screened or diagnosed PCa patients.

Sample Size Estimation

The present study used an online sample size calculator to estimate the sample size.[20] This online calculator follows the same principles as the WHO sample size formula ($n = z^2pq / e^2$). Here, the minimum eligible participants (n) were determined with 95% confidence intervals, n =1.96, expected proportion (p) = 54.7% (0.547), q = 0.453 (1-p), and margin of error (e) = 5%. This expected proportion (p) was derived from a study by Shaqran T M et al.[18] Hence, we concluded that the minimum number of eligible male participants required was 381.

Recruitment Strategies

The present study employed a convenience sampling method to recruit the eligible participants. In this method, eligible participants were invited from public places according to the data collection time and participant availability. Data collectors approached individuals in locations such as parks, malls, and community centers, briefly explained the study, and invited eligible males to participate on the spot. Participation was voluntary and based on immediate availability.

Ethical Considerations

The study was conducted in accordance with the principles outlined in the Declaration of Helsinki. After obtaining ethical approval and other necessary clearances from the relevant authorities (IRB of Jouf University, approval no. 11/3/46, dated January 29, 2025), the data collection process was initiated. Informed consents were secured from all participants prior to data collection, ensuring that they understood the purpose of the study and their right to withdraw at any time without consequence. Confidentiality was maintained throughout the research process, with data anonymized to protect participants' identities.

Data Collection Tool

We used a structured Arabic version of the questionnaire that was prepared by the research team after a focus group discussion with the experts from public health, pathology, and urology departments (content validity). During the focus group discussion, we produced and discussed the items based on existing evidence from open-source research studies.[16,17,21] The participants had to respond to the data collection tool through a Google form on their personal devices, which was prepared according to the approved LCBE documents. Originally, the questionnaire was developed in English. However, we made standard protocols to get the final Arabic version of the tool.[22,23] This tool was tested in the pilot study among 32 eligible males to check face validity and cultural suitability. The pilot study analysis explored acceptable Cronbach's alpha values of 0.84 for the knowledge section and 0.79 for the attitude section. These values indicate a high level of internal consistency, suggesting that the items within each section reliably measure the intended constructs. The tool consisted of three sections. The first section inquired about background characteristics of the study participants, such as age, region, income, occupation, etc.

Scoring and Categorization of Knowledge and Attitude

The second section consisted of 10 questions related to knowledge. The participants must respond with "yes", "no", or "not sure". The wrong answers and the not-sure answers were marked as 0 points, and the correct responses were marked as 1 point. In the attitude section, the responses will be recorded in a 5-point Likert's scale format, in which the participants responded from strongly agree to strongly disagree. We scored the attitude section responses on a scale from 1 (strongly disagree) to 5 (strongly agree). The research team gave reverse scoring for the negatively phrased questions. The total scores in knowledge and attitude were computed and categorized according to Bloom's criteria as low ($\leq$ 60% of the total score), medium (60–79%), and high ($\geq$ 80%). This approach was selected because Bloom's cutoffs provide a standardized method to convert raw scores into meaningful ordinal categories, allowing for better comparability with previous KAP studies and facilitating logistic regression analysis. Categorizing scores into three distinct levels also helps identify target groups for public health interventions by distinguishing participants with clearly inadequate knowledge or attitudes from those who are partially informed or fully knowledgeable.[24,25]

Data Analysis

We used the Statistical Package of Social Sciences (SPSS, V.23) for coding, analysis, and report generation. Descriptive statistics summarized demographic characteristics, knowledge levels, and attitudes toward prostate cancer screening. The Spearman correlation (non-parametric) test was applied to find the eligible males' knowledge and attitude towards PCa and its screening. This test was chosen as PCa knowledge and attitude scores were skewed. We performed binary logistic regression to find the predictors that are associated with the participants' knowledge and attitude. For regression analysis, we dichotomized each outcome as High = 1 and Low/Medium = 0. The following categories were used as reference groups: age (45–55 years), marital status (currently married), education (university and above), income ($\leq$10,000 SAR),

occupation (government sector), residence (city), smoking (non-smoker), and family history of PCa (no). We used the enter method in the logistic regression model. All selected independent variables were entered into the model simultaneously to assess their individual contributions while controlling for the effects of other variables. A p-value less than 0.05 was considered statistically significant.

Results

We approached 431 eligible males during the data collection process to obtain the minimum number of participants for the survey (response rate = 88.4%). Of the 381 participants, 50.7% belonged to the 45- to 55-year age group (mean ± SD = 55.18 ± 9.2). The majority were currently married (82.2%), falling in the income group of 5000 to 10000 SAR (1 USD = 3.75 SAR), working in the private sector (36.2%), living in cities (60.9%), non-smokers (70.1%), and had no family history of PCa (91.1%) (Table 1).

Regarding participants' knowledge of PCa and its screening, the highest proportion of correct answers was noted in "healthy lifestyle reduces PCa risks (66.7%)", followed by "high-risk age groups (55.6%)", and smoking is a risk factor (54.3%). The participants responded with the highest proportion of wrong answers in PCa always causes symptoms in the early stage (68.8%) (Table 2).

Table 1 Background Characteristics of the Patients (N= 381)

Variable	Frequency	Proportion
Age (mean ± SD)	50.18 ± 9.2	
Age group		
45 to 55 years	193	50.7
56 and above	188	49.3
Marital status		
Single	68	17.8
Currently married	313	82.2
Education		
Up to high school	107	28.1
University and above	274	71.9
Income (SAR)*		
Up to 5000	94	24.7
5000 to 10000	161	42.3
More than 10000	126	33.0
Occupation		
Government	117	30.7
Private	138	36.2
Retired	86	22.6
Unemployed	40	10.5
Residential status		
City	232	60.9
Rural	149	39.1
Smoking		
Yes	114	29.9
No	267	70.1
Family history of prostate cancer (PCa)		
No	347	91.1
Yes	34	8.9

Note: *1 USD = 3.75 SAR.

Table 2 Participants' Responses in the Knowledge Category (N= 381)

Items	Correct Answer		Wrong Answer	
	n	%	n	%
High-risk age group for PCa	212	55.6	169	44.4
PCa is usually detected early by screening	195	51.2	186	48.8
Family history increases PCa risk	164	43.0	217	57.0
PCa always causes symptoms in its early stages*	119	31.2	262	68.8
Surgery is the only treatment for diagnosed PCa*	158	41.5	223	58.5
A healthy lifestyle reduces PCa risk	254	66.7	127	33.3
PCa is a contagious disease*	184	48.3	197	51.7
Early-detected PCa is treatable	136	35.7	245	64.3
Smoking is a risk factor for PCa	207	54.3	174	45.7
PCa is only diagnosed with symptoms*	113	29.7	268	70.3

Note: *Reverse scoring.

Regarding participants' attitude, the highest promotion of agreement was observed for the statement, "I am confident that I know enough about PCa to make informed decisions about screening (overall = 69.1%, strongly agree = 26.8%, agree = 42.3%)" and "I would be willing to undergo PCa screening if recommended by my doctor (overall = 65.8%, strongly agree = 34.6%, agree = 31.2%)" (Table 3).

Of the 381 participants, 23.1% had low, 39.9% had medium, and 37.0% had high levels of knowledge towards PCa. Regarding attitude, 18.4% had low, 34.1% had medium, and 47.5% had high levels of attitude towards PCa and its screening (Figure 1). The Spearman correlation test revealed a positive and significant correlation between knowledge and attitude (rho = 0.609, p = 0.001) (Table 4). Furthermore, a scatter plot showing the positive correlation between knowledge and attitude scores toward prostate cancer screening among participants is presented in Figure 2.

Table 3 Participants' Responses in the Attitude Section (n = 381)

Item	Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)
I believe regular screening for PCa is necessary for early detection.	44 (11.5)	103 (27.0)	109 (28.6)	75 (19.7)	50 (13.1)
I feel uncomfortable discussing prostate health with my doctor.*	73 (19.2)	131 (34.4)	86 (22.6)	63 (16.5)	28 (7.3)
I would be willing to undergo PCa screening if recommended by my doctor.	132 (34.6)	119 (31.2)	64 (16.8)	41 (10.8)	25 (6.6)
I am concerned about the potential side effects of PCa treatments.*	96 (25.2)	92 (24.1)	74 (19.4)	60 (15.7)	59 (15.5)
I think PCa screening should be a part of routine health check-ups for men over 50.	105 (27.6)	98 (25.7)	61 (16.0)	70 (18.4)	47 (12.3)
I believe that the risks associated with PCa screening outweigh its benefits.*	66 (17.3)	88 (23.1)	107 (28.1)	67 (17.6)	53 (13.9)
I feel that having no symptoms means there's no need to get screened for PCa.*	119 (31.2)	101 (26.5)	65 (17.1)	63 (16.5)	33 (8.7)
I am confident that I know enough about PCa to make informed decisions about screening.*	102 (26.8)	161 (42.3)	76 (19.9)	27 (7.1)	15 (3.9)
I believe PCa is a serious health issue that men should be aware of.	104 (27.3)	113 (29.7)	82 (21.5)	48 (12.6)	34 (8.9)
I think my cultural beliefs affect my willingness to undergo PCa screening.*	68 (17.8)	86 (22.6)	113 (29.7)	68 (17.8)	46 (12.1)

Note: *Reverse scoring.

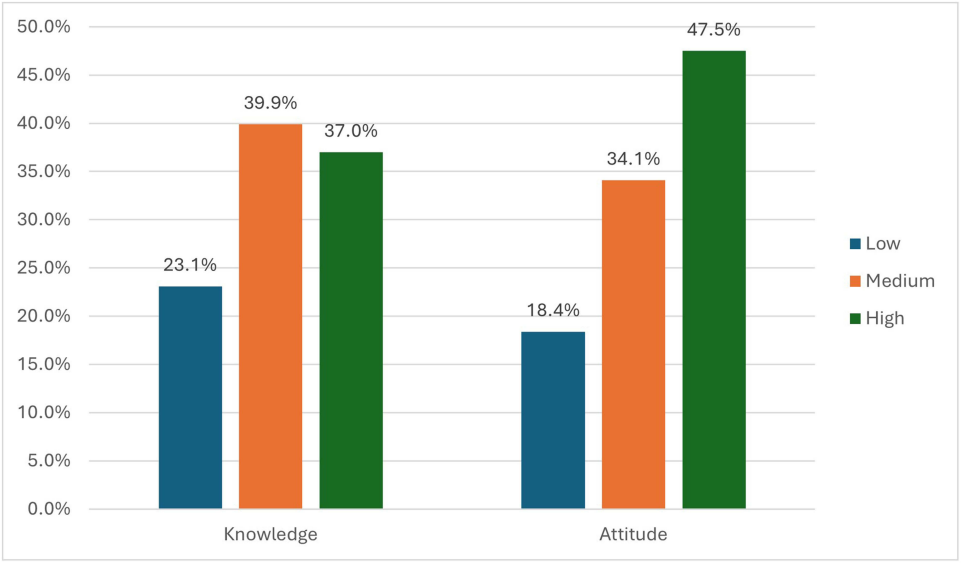

Figure 1 Distribution of Knowledge and Attitude Levels toward Prostate Cancer Screening among Participants (n = 381). Low = ≤60%, Medium = 61–79%, High = ≥80% (Bloom's criteria).

Through the binary logistic regression, after adjusting with the independent variables, we found that knowledge was significantly higher among those working in the private sector (ref: government sector, adjusted odds ratio (aOR) = 2.79, 95% confidence interval (CI) = 1.63–4.22, and p = 0.003) and had a family history of PCa (ref: no family history, aOR = 2.11, 95% CI = 1.75–2.81, and p = 0.017). Significantly lower levels of knowledge are observed in people aged above 55 years (ref: 45 to 55 years, aOR = 0.78, 95% CI = 0.53–0.91, and p = 0.009) and those who live on the rural side (ref: live in the city, aOR = 0.53, 95% CI = 0.27–0.81, and p = 0.007) (Table 5).

Regarding attitude, we found that smokers (ref: non-smokers, aOR = 0.48, 95% CI = 0.27–0.62, and p = 0.001) and those who live on the rural side (ref: live in the city, aOR = 0.59, 95% CI = 0.44–0.81, and p = 0.004) had significantly lower levels (Table 6).

Discussion

PCa, being one of the predominant cancer types among Saudi men and among males worldwide, sufficient awareness is a pivotal factor in early detection and reducing mortality rates. The present study assessed the northern Saudi males' knowledge and attitude towards PCa and its screening.

Knowledge Level Regarding PCa

Despite the advancements in healthcare and information distribution, the present study results indicate that a substantial proportion of eligible northern Saudi males still have low or medium knowledge of PCa and its screening. This finding highlights potential barriers to health education and awareness in this population.

The proportion of adequate and inadequate knowledge varies across the studies from different countries and within KSA.[17,21,26,27] A survey by Maladze N et al in South Africa stated that more than 60% of their participants had insufficient awareness of PCa.[17] Another study by Morlando M et al conducted in a European country, reported a moderate level of knowledge of PCa among its participants.[27] Interestingly, Musalli ZF et al have shown that more

Table 4 Spearman Correlation Analysis Between Knowledge and Attitude

Variable	Spearman's rho / p-value
Knowledge – Attitude	0.609/0.001

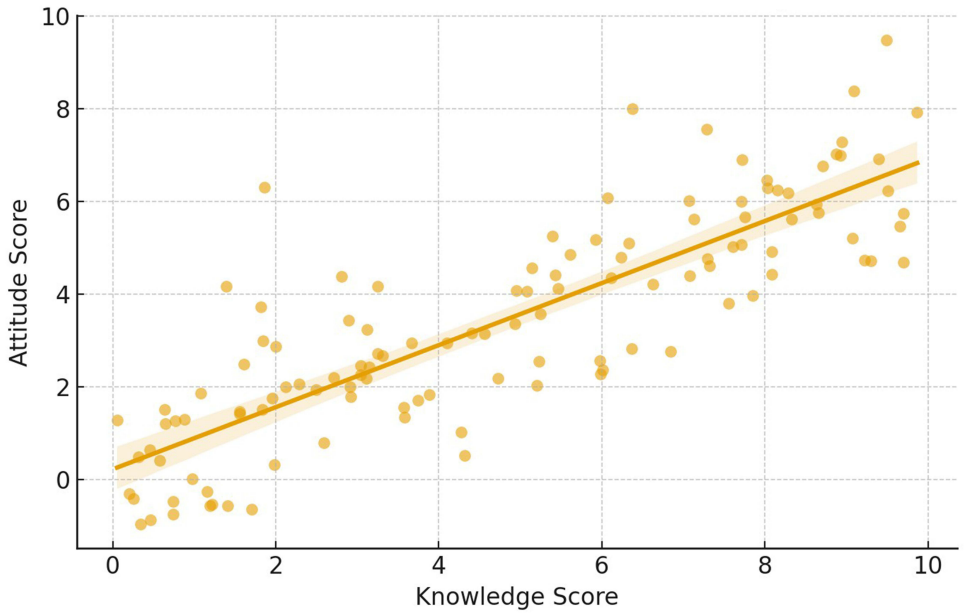

Figure 2 Scatter plot showing the positive correlation between knowledge and attitude scores toward prostate cancer screening among participants (n = 381).

than 60% of their participants had adequate knowledge of PCa.[26] These variations may reflect differences in sociocultural and demographic profiles, as well as in the data collection tools used. For example, Musalli ZF et al conducted a study in the capital city of KSA.

To address these gaps, tailored regional-specific public health efforts, such as mobile health awareness campaigns and teleservices, are required, especially in rural settings.

Table 5 Binary Logistic Regression Analysis of Knowledge Towards PCa Risk Factors and Screening (n = 381)

Variables	Total	Knowledge			
		Low/ Medium n = 240	High n = 141	Adjusted Odds Ratio (aOR) (95% Confidence Interval [CI])*	p-value
Age group					
45 to 55 years	193	139	54	Ref	
56 and above	188	101	87	0.78 (0.53–0.91)	0.009
Marital status					
Single	68	42	26	Ref	
Currently married	313	198	115	0.87 (0.54–2.19)	0.383
Education					
Up to high school	107	65	42	Ref	
University and above	274	175	99	1.12 (0.76–2.50)	0.115
Income (SAR)					
Up to 5000	94	54	40	Ref	
5000 to 10000	161	98	63	2.35 (0.59–5.76)	0.417
More than 10000	126	88	38	1.96 (0.83–3.72)	0.153

(*Continued*)

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Table 5 (Continued).

Variables	Total	Knowledge			
		Low/ Medium n = 240	High n = 141	Adjusted Odds Ratio (aOR) (95% Confidence Interval [CI])*	p-value
Occupation					
Government	117	92	25	Ref	
Private	138	62	76	2.79 (1.63–4.22)	0.003
Retired	86	57	29	0.93 (0.81–3.48)	0.712
Unemployed	40	29	11	1.36 (0.59–2.67)	0.284
Residential status					
City	232	137	95	Ref	
Rural	149	103	46	0.53 (0.27–0.81)	0.007
Smoking					
Yes	114	63	51	Ref	
No	267	177	90	1.46 (0.65–3.73)	0.576
Family history of PCa					
No	347	213	134	Ref	
Yes	34	27	7	2.11 (1.75–2.81)	0.017

Notes: *Adjusted in the binomial regression model with other variables (age, marital status, education, income, occupation, residential status, smoking, and family history).

Table 6 Binary Logistic Regression Analysis of Attitude Towards PCa Risk Factors and Screening

Variables	Total	Attitude			
		Low/ Medium n = 200	High n = 181	aOR (95% CI)*	p-value
Age group					
45 to 55 years	193	98	95	Ref	
56 and above	188	102	86	1.49 (0.87–2.74)	0.207
Marital status					
Single	68	37	31	Ref	
Currently married	313	163	150	0.94 (0.67–3.38)	0.439
Education					
Up to high school	107	55	52	Ref	
University and above	274	145	129	2.57 (0.88–5.12)	0.837
Income (SAR)					
Up to 5000	94	58	36	Ref	
5000 to 10000	161	77	84	1.09 (0.93–1.70)	0.091
More than 10000	126	65	61	0.67 (0.49–3.51)	0.403
Occupation					
Government	117	70	47	Ref	
Private	138	54	84	1.61 (0.59–1.53)	0.187
Retired	86	47	39	1.72 (0.79–3.35)	0.405
Unemployed	40	29	11	0.63 (0.32–2.94)	0.673

(*Continued*)

Table 6 (Continued).

Variables	Total	Attitude			
		Low/ Medium n = 200	High n = 181	aOR (95% CI)*	p-value
Residential status					
City	232	104	128	Ref	
Rural	149	96	53	0.48 (0.27–0.62)	0.001
Smoking					
Yes	114	67	47	Ref	
No	267	133	134	0.59 (0.44–0.81)	0.004
Family history of PCa					
No	347	185	162	Ref	
Yes	34	15	19	1.88 (0.73–3.10)	0.382

Notes: *Adjusted in the binomial regression model with other variables (age, marital status, education, income, occupation, residential status, smoking, and family history).

Predictors of Knowledge

In this study, the older population demonstrated a lower level of knowledge than younger people. Other factors associated with a higher-level awareness of PCa and its screening methods were work setting and family history. The finding that older participants had significantly lower knowledge is particularly concerning, as advancing age is the primary risk factor for PCa. This gap may be partly explained by lower digital literacy among older adults, limiting their exposure to online health information campaigns, as well as cultural stigma or fatalistic beliefs about cancer that reduce interest in screening.[28,29] Similar to the present study, Maladze N et al found a negative association between age and PCa awareness.[17] In contrast to the present study, some studies have not fond an association with the age of the participants, and those studies found a significant association with other sociodemographic characteristics, including education and marital status.[30,31] Higher awareness among private-sector employees may be attributed to increased exposure to corporate wellness programs, periodic health check-ups, and health campaigns offered as employee benefits. This is supported by evidence that workplace wellness programs in Saudi Arabia improve general health behaviors.[32] This group also tends to be younger, more urban, and more educated, which may partly account for their higher knowledge. Differences in health insurance coverage and occupational health initiatives between sectors could further contribute to this disparity. Similarly, those with a family history of prostate-related problems are more likely to be more aware as a result of their own experiences or referred to counseling by their healthcare providers.

Previous studies regarding this variable support our research findings.[33,34] It is crucial to note that knowledge of PCa was significantly lower among individuals from rural areas compared to those in urban settings. Similarly, Musalli ZF et al[26] and Ariyo DA et al[35] found a higher knowledge among their participants from urban settings.

To reach the many rural communities, outreach programs should include mobile health units designed to travel to these sites, such as, community leaders, and local health workers to provide prostate cancer education and screening services. Furthermore, campaigns need to consider the literacy level of their target audience, which means relying on visual aids, storytelling, and other means to convey health education messages.

Attitude Toward PCa Screening

A higher proportion of participants demonstrated a high-level attitude compared to those with high knowledge. Still, a considerable proportion of males had either a low or medium attitude toward PCa and uptake of PCa screening. Similar to the variations in the proportion of different knowledge categories, the attitudes also vary in various settings. Some studies have shown high levels of positive attitude and perceptions, and others have shown inadequate levels of attitude.[33,35–37]

Predictors of Attitude

We found that attitudes toward PCa and its screening were lower among those in rural areas and smokers. The lower attitudes observed among rural participants may reflect disparities in health literacy and access to primary care services, which are more concentrated in urban areas. These findings add further evidence that health-related attitudes are influenced by sociodemographic and lifestyle factors. Similar barriers may also affect knowledge, as lower attitudes among rural populations may derive from less access to healthcare resources, less exposure to health promotion campaigns, and existing cultural norms that discourage proactive health-seeking behaviors. However, smoking status may be associated with lower attitudes, at least in part, a result of a complicated interplay between behavioral and psychological factors. Smoking is often related to risk-taking behavior and lower priority in the prevention of healthcare.[38,39]

Prostate cancer awareness should be integrated with overall smoking cessation programs for smokers, according to public health campaigns. Addressing PCa screening and smoking at the same time can foster healthier behaviors while changing attitudes. Integrating PCa awareness into other existing national programs, such as chronic disease clinics and wellness initiatives, could efficiently reach high-risk groups and maximize resources. Strengthening rural outreach, mobile health units, and community-based education is essential to bridging this gap and aligns with the goals of Vision 2030 to reduce health inequities. Collaboration with community leaders, mosques, and local media may enhance trust and participation in screening efforts. Together, these strategies could contribute to earlier detection, improved treatment outcomes, and reduced burden on the healthcare system.

Correlation Between Knowledge and Attitude

Our study demonstrated a strong positive correlation between knowledge and attitude scores, indicating that participants with better knowledge are also more likely to have favorable attitudes toward PCa screening.

This finding underscores the importance of health education campaigns, as improving knowledge may simultaneously improve attitudes and increase willingness to participate in screening programs. Similar associations have been reported in previous KAP studies, supporting the link between awareness and health-seeking behavior.[31,40]

Even though we conducted this study on a unique population on essential health issues using a standardized and validated questionnaire, Readers of this study should consider the following limitations:

1. This epidemiological study was conducted in two regions of KSA. Due to varying sociodemographic profiles in the country, it is difficult to generalize the findings.
2. The present study revealed the association between certain variables with knowledge and attitudes. But cannot establish the temporal or causal relationship.
3. Due to the nature of the study methods, we could not evaluate the qualitative component of the participants' knowledge and attitudes towards PCa.
4. As this study used convenience sampling at public places, selection bias cannot be excluded, and the findings may not fully represent all northern Saudi males.

Conclusion

This study revealed that a sizable proportion of Northern Saudi males had either low or medium levels of knowledge and attitudes toward PCa and its screening, with a positive correlation between knowledge and attitude. Tailored regional-specific public health efforts, such as mobile health awareness campaigns and teleservices, are required to address these gaps, especially in rural settings. Integrating PCa awareness with broader smoking cessation initiatives can enhance early detection efforts and align with comprehensive cancer control strategies. Moreover, we recommend evaluating the qualitative aspects associated with the participants' understanding of PCa through a multi-region mixed-method survey. Future initiatives should also focus on involving primary healthcare providers, community pharmacists, and religious/community leaders to improve trust and participation in screening programs. These strategies may help bridge inequities in cancer care and support Saudi Arabia's Vision 2030 goals for improving population health.

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Disclosure

The authors report no conflicts of interest in this work.

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